

Remarks

Claims 117-140 and 163-213 are pending in the Application.

Claims 123-125 and 178-183 are withdrawn from consideration.

Claims 117-122, 126-140, 163-177 and 184-213 are rejected.

Claim 117, 120, 127-131, 135-136, 139-140, 165-166, 170, 172, 185-190, 193-196, 199, 201-204, 207, 209-211 and 213 are amended herein.

Claims 123-126, 132-134, 138, 141-162, 167, 178-183 and 208 are cancelled herein without prejudice.

Claim 214 is added herein.

I. RESTRICTION REQUIREMENT UNDER 35 U.S.C. § 121

Examiner has restricted Claims under 35 U.S.C. §121. Examiner has required Applicant to elect a single disclosed species for prosecution on the merits to which the claims shall be restricted. Office Action, at 2. In particular, Examiner required Applicant to elect a single matrix material and a single structured material. *Id.*

As indicated to Examiner on August 2, 2004, Applicant affirms its election, without traverse, to prosecute the invention of “polymer” (matrix material), and “carbon” (structured material), claims 117-112, 126-140, 163-177 and 184-213. Examiner has withdrawn Claims 123-125 and 178-183 from further consideration under 37 CFR 1.142(b), as being drawn to a non-elected species. Accordingly, Applicant has cancelled Claims 123-125 and 178-183 herein without prejudice.

II. REJECTIONS UNDER 35 U.S.C. § 112, ¶ 2

Examiner has rejected Claims 131, 132, 134, 195 and 204 under 35 U.S.C. § 112, ¶ 2, as

being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. Office Action, at 4.

Examiner asserts the term “precursor” is indefinite and asks a) “[i]n claim 131 and 204, what is the ‘precursor’?” Office Action, at 4. Applicant respectfully traverses Examiner’s argument that the term ‘precursor’ is indefinite.

“Precursor” is a well known term in chemistry. *The New Lexicon Webster’s Dictionary of the English Language*, 1988 Edition, Lexicon Publications, Inc., New York, (“Webster”) defines “precursor” in one context as “something which precedes something else” (*Webster’s* at p. 789, excerpts of which are attached hereto at Exhibit A). A chemical definition from *Webster’s On-Line Dictionary* defines “precursor” in the chemical sense as a “[c]hemical compound which forms a first stage of chemical process and serving as substrate in its further stages.” (The first page of the url address: www.websters-online-dictionary.org/definition/english/pr/precursor.html which reflects this chemical definition, is attached hereto at Exhibit B.)

The Application utilizes the term ‘precursor’ consistent with this definition. For example, the Application states: “The carbon nanotube structural constituent may be uniformly mixed with a matrix material precursor (polymer solution, pre-fired ceramic particles or the like) and then converted to a composite by conventional techniques.” (Application at page 65, *ll.* 22-24)

Therefore, as a result of the foregoing, Applicant respectfully requests that the Examiner withdraw his rejection of Claims 131 and 204, under 35 U.S.C. § 112, ¶ 2, as being indefinite.

Examiner further asserts that the claims are indefinite when he asks b) “[i]n claim 195, how is BN in sidewall? It is a free-standing compound.” Office Action, at 4. Applicant respectfully traverses Examiner’s argument that ‘BN in sidewall’ is indefinite.

The Application states that BN replaces part of the carbon nanotube’s lattice, and, as such, is part of the wall of the nanotube. Application, at 65, *ll.* 3-4, states “As described above, the carbon nanotube material may also have a part of its lattice replaced with boron nitride.”

However, to clarify the claims, Applicant has amended Claims 194 and 195. Claim 194 includes the requirement “wherein at least one of the side-wall defects comprises replacement of at least one carbon atom in the single-wall carbon nanotube lattice with at least one non-carbon

atom.” Claim 195, which is dependent on Claim 194, has been amended to require “the non-carbon atom is selected from the group consisting of boron, nitrogen, and combinations thereof.” Therefore, as a result of the foregoing, Applicant respectfully requests that the Examiner withdraw his rejection of Claim 195, under 35 U.S.C. § 112, ¶ 2, as being indefinite.

Examiner further asserts that the claims are indefinite when he asks “c) In claim 132- ‘forming’ is by definition simultaneous. 134 is impossible. Is ‘shaping’ mean instead of ‘forming’?” Office Action, at 4-5.

Applicant has cancelled Claims 132 and 134. Therefore, this rejection is now moot.

Accordingly, as the terms of the claims are defined, Applicant respectfully requests Examiner to withdraw his rejection of Claims 131, 204 and 195 under 35 U.S.C. § 112, ¶ 2.

III. REJECTIONS UNDER 35 U.S.C. § 102(b) OVER AJAYAN

Examiner has rejected Claims 117-120, 126, 130, 131, 133, 135, 138, 171-174 and 186-189 under 35 U.S.C. § 102(b) as being anticipated by Ajayan et al., “Aligned Carbon Nanotube Arrays Formed by Cutting a Polymer Resin-Nanotube Composite,” *Science* **265**, August 26, 1994, pp 1212-1214 (“*Ajayan*”). Office Action, at 3.

Examiner contends that the “reference teaches nanotubes in epoxy-polymer. ‘carbon’ encompasses nanotubes, so it fulfills both roles. In so far as the claims are interpreted (or will be amended) to require a non-nanotube carbon, then the examiner takes Official Notice that nanotubes are expected to have trace carbon impurities from their synthesis. No difference is seen in the structure or properties, as the materials are the same as claimed.” Office Action at 3.

Regarding Claims 117 and 131, these claims are independent claims, each of which has been amended. The amendments all now require “single-wall carbon nanotube material” or “single-wall carbon nanotubes,” instead of “carbon nanotube material” or “carbon nanotubes,” respectively.

Anticipation requires each and every element of the claim to be found within the cited prior art reference. *Ajayan* teaches multi-wall carbon nanotubes and does not teach single-wall

carbon nanotubes. Because this element is not disclosed in or taught by *Ajayan*, Claims 117 and 131 are not anticipated by *Ajayan*.

Examiner further contends concerning Claim 130, “cutting is deemed as a modification.” Office Action, at 3. Regarding Claim 130, this claim has been amended to depend directly from amended Claim 117, and further amended by replacing the word “modified” with “derivatized” and the word “interact” has been replaced with the words “chemically react.” No new matter has been added by way of this amendment. Support for the amendment is found in the Application, at 64, *ll.* 22-24: “End cap derivatization of carbon nanotubes can facilitate the bonding of the carbon nanotubes to each other or to the matrix material.” *Ajayan* does not teach single-wall carbon nanotubes; nor does it disclose single-wall carbon nanotubes that have been derivatized. As a result of the foregoing amendment, Applicant asserts that Claim 130, as amended, is not anticipated by *Ajayan*.

Examiner further contends “Claim 135 is met because two solid objects cannot occupy the same space at the same time.” Office Action, at 3. Regarding Claim 135, this claim has been amended to require a single-wall carbon nanotube material and further amended for clarity. Claim 135, as amended, now claims “The method of claim 131, wherein said matrix material precursor is a fluid and wherein said single-wall carbon nanotube material is in a pre-formed arrangement.” In addition, Claim 214 has been added. Claim 214 indirectly depends from Claim 131 and requires that the pre-formed arrangement be selected from the group consisting of a bucky paper and a felt. No new matter has been added by way of this amendment and added claim. Support for the amendment and added claim is found in the Application, at 65, *ll.* 24-27, which states “Structural layers or components (*e.g.*, felts or bucky paper) can also be preformed from the carbon nanotube materials and impregnated with a prepolymer solution to form the composite.”

Regarding Claims 135 and 214, *Ajayan* does not teach single-wall carbon nanotubes; nor does *Ajayan* teach single-wall carbon nanotubes in a pre-formed arrangement such as a bucky paper or a felt. As a result of the foregoing amendment, Applicant asserts that Claim 135, as amended, and Claim 214 are not anticipated by *Ajayan*.

Regarding Claims 126, 133 and 138, these claims have been cancelled without prejudice.

Regarding Claims 118-120, these claims are dependent on amended Claim 117, and are not anticipated by *Ajayan* for the same reasons that Claim 117, as amended, is not anticipated.

Regarding Claim 171, this claim is an independent claim which, besides the elements of carbon nanotubes and a matrix material, requires the element of a fibrous structural constituent. *Ajayan* does not teach or disclose an additional fibrous structural constituent, and, therefore, Claim 171 is not anticipated by *Ajayan*.

Regarding Claims 172-174, these claims directly or indirectly depend from Claim 171 and are not anticipated by *Ajayan* for the same reason that Claim 171 is not anticipated. Also regarding Claim 172, this claim has been further amended with the removal of “carbon” from the Markush group. Regarding Claims 186-189, these claims have been amended to depend from amended Claim 171, which was intended originally, rather than depending from Claim 117, which was written unintentionally in error. Claims 186-189 have been further amended for clarity and no new matter was added by way of these amendments. Claim 188 has further been amended to include “bucky paper.” Support for this amendment is found in the Application at 65, *ll.* 24-27: “Structural layers or components (*e.g.*, felts or bucky paper) can also be preformed from the carbon nanotube materials and impregnated with a prepolymer solution to form the composite.” No new matter has been added by way of this amendment. Furthermore, regarding Claims 186-189, these claims directly depend from Claim 171 and are not anticipated by *Ajayan* for the same reasons that Claim 171, as amended, is not anticipated.

Therefore, as a result of the foregoing, Applicant respectfully requests that the Examiner withdraw his rejection of Claims 117-120, 130, 131, 135, 171-174 and 186-189 under 35 U.S.C. § 102(b) as being anticipated by *Ajayan*.

III. REJECTIONS UNDER 35 U.S.C. § 103(a) OVER AJAYAN

Examiner has rejected Claims 127, 128, 130, 132, 134, 139, 140, 165, 166, 170, 184-187 and 200-204 under 35 U.S.C. § 103(a) as being unpatentable over *Ajayan*. Office Action, at 3.

Examiner contends the “reference does not explicitly embody SWNTs, but these are

suggested on page 1214 middle. Using the claimed amount, type, etc. is an obvious expedient to make a conductive composition.” Office Action at 3.

To establish a *prima facie* case of obviousness, three basic criteria must be met. First, there must be some suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify the reference or to combine reference teachings. Second, there must be a reasonable expectation of success. Finally, the prior art reference (or references when combined) must teach or suggest all the claim limitations. The teaching or suggestion to make the claimed combination and the reasonable expectation of success must both be found in the prior art and not based on applicant’s disclosure. See M.P.E.P. 706.02(j); see also *In re Vaeck*, 947 F.2d 488, 20 U.S.P.Q.2d 1438 (Fed. Cir. 1991).

Regarding Claims 127, 128, 139, 140, 186 and 187, all of these claims have been amended to require ropes or fibers of single-wall carbon nanotubes. *Ajayan* in the middle of page 1214 refers to the “aligning process” and is very speculative in nature.

Further regarding Claims 127, 128, 139, 140, 186 and 187, all of these claims have been amended to require “single-wall carbon nanotube material” or “single-wall carbon nanotubes,” rather than “carbon nanotube material” or “carbon nanotubes.” Claims 127, 139 and 186 further require that the single-wall carbon material comprise ropes of up to about 10^3 single-wall carbon nanotubes. Claims 128, 140 and 187 further require that the single-wall carbon nanotube material comprise fibers of greater than 10^6 single-wall carbon nanotubes. *Ajayan* does not teach or suggest ropes or fibers of single-wall carbon nanotubes, and the disclosures of *Ajayan* appear to teach away from the alignment of thicker nanotubes. *Ajayan* states “All the longer and thinner tubes have been oriented, whereas the thicker and shorter tubes and the nanoparticles have a random orientation.” (*Ajayan*, at 1212, col. 3, last paragraph). Thus, as ropes and fibers are much thicker than the individual single-wall carbon nanotubes, the disclosures of *Ajayan* appear also to teach away from ropes and fibers of single-wall carbon nanotubes. Furthermore, as stated above, Claims 186 and 187 now depend from Claim 171, which also requires a fibrous structural constituent, not taught or suggested by *Ajayan*. Thus, as *Ajayan* does not teach or suggest all the elements of the claims and teaches away from the present invention, Claims 127, 128, 139, 140,

186 and 187 are not *prima facie* obvious over *Ajayan*.

Regarding Claims 130, 165, 166 and 201, all of these claims have been amended to require a single-wall carbon nanotube that is derivatized to be chemically reactive with the matrix material. *Ajayan* does not teach or suggest single-wall carbon nanotubes that are derivatized, nor does it teach or suggest derivatizing so as to chemically react with the matrix material. The teachings of *Ajayan* appear to teach away from derivatizing the nanotubes so that they chemically react with the matrix material, because a reaction between the nanotube and the matrix material could produce crosslinks in the nanotube-matrix material that would serve to deter or inhibit the production of aligned nanotubes that *Ajayan* seeks. Thus, as *Ajayan* does not teach or suggest all the elements of these claims, and, also teaches away from the claims of the instant invention, Claims 130, 165, 166 and 201 are not *prima facie* obvious over *Ajayan*.

Regarding Claim 202, this claim is dependent on Claim 201, which has been amended to require derivatized single-wall carbon nanotubes and a polymer that has at least one pendant group capable of a chemical reaction with the derivatized single-wall carbon nanotubes. *Ajayan* does not teach or suggest single-wall carbon nanotubes; nor does it teach or suggest derivatizing single-wall carbon nanotubes. Claim 202 further requires the chemical reaction be promoted by photolysis. *Ajayan* does not teach or suggest this requirement. No teaching or suggestion in *Ajayan* would motivate one of ordinary skill in the art to perform the claimed invention. Thus, Claim 202 is not *prima facie* obvious over *Ajayan*.

Regarding Claims 132 and 134, these claims have been cancelled herein without prejudice.

Regarding Claims 170, this claim has been amended for clarity. *Ajayan* does not teach or suggest single-wall carbon nanotubes with any specific length; nor does it teach or suggest single-wall carbon nanotubes that have lengths in the range between 5 and 500 nm. Thus, as *Ajayan* does not teach or suggest all the elements of this claim, Claim 170 is not *prima facie* obvious over *Ajayan*.

Regarding Claim 184 and amended Claim 185, these claims depend from Claim 171, which requires the element of a fibrous structural constituent, not taught or suggested by *Ajayan*.

Further, regarding Claim 184, *Ajayan* does not teach or suggest single-wall carbon nanotubes that have been subjected to a purification process. Further, regarding Claim 185, *Ajayan* does not teach or suggest single-wall carbon nanotubes; nor does it teach or suggest single-wall carbon nanotubes that have a homogeneous characteristic of length, diameter, helicity or combination thereof. Thus, as *Ajayan* does not teach or suggest all the elements of these claims, Claims 184 and 185 are not *prima facie* obvious over *Ajayan*.

Regarding Claim 200, this claim requires single-wall carbon nanotubes having loops. *Ajayan* does not teach or suggest single-wall carbon nanotubes; nor does it teach or suggest single-wall carbon nanotubes having loops. *Ajayan* teaches away from the requirements of this claim in that *Ajayan* teaches and suggests a method for preparing aligned nanotubes, not a composite comprising single-wall carbon nanotubes having loops. Thus, as *Ajayan* does not teach or suggest all the elements of this claim, Claim 200 is not *prima facie* obvious over *Ajayan*.

Regarding Claim 203 and 204, both of these claims have been amended to require that “the plurality of single-wall carbon nanotubes are derivatized to facilitate bonding to other single-wall carbon nanotubes, the matrix material precursor or both,” a feature not taught or suggested by *Ajayan*. The teachings of *Ajayan* appear to teach away from derivatizing nanotubes so that they chemically react with each other, a matrix material or a matrix material precursor, since reactions between the nanotubes and/or a matrix material or a matrix material precursor would result in crosslinks in the composite that would deter or inhibit the alignment of the nanotubes that *Ajayan* seeks. Thus, as *Ajayan* does not teach or suggest all the elements of these claims, and, also teaches away from the claims of the instant invention, Claims 203 and 204, as amended, are not *prima facie* obvious over *Ajayan*.

Therefore, as a result of the foregoing, Applicant respectfully requests that the Examiner withdraw his rejection of Claims 127, 128, 130, 139, 140, 165, 166, 170, 184-187 and 200-204 under 35 U.S.C. § 103(a) as being obvious over *Ajayan*.

IV. REJECTIONS UNDER 35 U.S.C. § 103(a) OVER AJAYAN AND TAKEN WITH APPLICANT'S ADMISSIONS

Examiner has rejected Claims 121, 122, 129, 136, 137, 163, 164, 167-169, 175-177, 196-199 and 205-213 as being unpatentable under 35 U.S.C. § 103(a) as obvious over *Ajayan*, as applied to claims 117-120, 126-128, 130-135, 138-140, 165, 166, 170-174, 184-189 and 200-204 above, and further in view of Applicant's admissions as to the scope and content of the prior art. Office Action, at 4.

Examiner contends that:

Ajayan does not teach the claimed polymers, etc., however applicants admit on pages 62, 63 of the specification that these are old and known. Using them in the composites of *Ajayan* is an obvious expedient to make a polymeric composite. In any event, the examiner takes Official Notice that the claimed polymers, structural agents and other additives are old and known in the art. Using them in the polymer of *Ajayan* is an obvious expedient to exploit the properties of the nanotubes (*Ajayan* pg 1212). Concerning the process steps (claim 203 etc.), the examiner takes Official Notice that these are old and known. Indeed, it appears that the only support applicants have for these features is in the prior-art documents they have incorporated by reference.

Office Action at 4.

Regarding Claims 167 and 208, these claims have been cancelled herein without prejudice.

Regarding Claims 121 and 122, and Claim 129, as amended herein, these claims directly or indirectly depend on Claim 117, which has been amended to require single-wall carbon nanotubes. Regarding Claims 175-177, these claims depend indirectly from Claim 171, which requires a fibrous structural constituent. Further regarding Claims 121 and 122, *Ajayan* neither discloses or suggests the claimed polymers nor discloses or suggests the combination of single-wall carbon nanotubes with the claimed polymers. Furthermore, Claims 175-177 are indirectly dependent on Claim 171, which require the additional element of a fibrous structural constituent in the composition which is neither taught nor suggested by *Ajayan*. Likewise, Claim 129, dependent on Claim 117, which, as noted above, was amended to require single-wall carbon

nanotubes, also requires the composite further comprise an additional fibrous material. A *prima facie* showing of obviousness requires, *inter alia*, that there must be some suggestion or motivation, either in the reference itself or in the knowledge generally available to one of ordinary skill in the art, to modify the reference. There is no suggestion or motivation in *Ajayan* to incorporate an additional fibrous material. The references, considered as a whole, must suggest the desirability and thus the obviousness of making the combination without the benefit of hindsight reasoning. As there is no suggestion or motivation in the references to make the claimed combination, taken without the benefit of hindsight reasoning, a *prima facie* case of obviousness has not been established. Therefore, Claims 121, 122, 129 and 175-177, as amended, are not *prima facie* obvious over *Ajayan*, and further in view of Applicant's admissions as to the scope and content of the prior art.

Regarding Claim 196, an independent claim, this claim has been amended to clarify that the laminate claimed comprises a fibrous material in a mixture of carbon nanotubes and a polymer matrix material. Claim 136, also an independent claim, has been amended to claim a method for producing a composite "comprising" carbon nanotubes" rather than "containing" carbon nanotubes. In each of Claims 136 and 196, besides the element of a matrix material, the claims require the element of a fibrous material. Further regarding Claims 136 and 196, *Ajayan* does not disclose or suggest the combination of carbon nanotubes, an additional fibrous material and a matrix material. A *prima facie* showing of obviousness has not been established because there is no suggestion or motivation, either in the reference itself or in the knowledge generally available to one of ordinary skill in the art, to modify the reference. The references, considered as a whole, do not suggest the desirability and thus the obviousness of making the combination without the benefit of hindsight reasoning. As there is no suggestion or motivation in the references to make the claimed combination, taken without the benefit of hindsight reasoning, a *prima facie* case of obviousness has not been established. Therefore, Claims 136 and 196, as amended, are not *prima facie* obvious over *Ajayan*, and further in view of Applicant's admissions as to the scope and content of the prior art.

Furthermore, Claim 137 depends directly from Claim 136, as amended, and Claims 197-198, depend from Claim 196, as amended. These dependent claims add further limitations

beyond those required by the amended independent claims from which they depend. Therefore, since Claims 136 and 196, as amended, are not *prima facie* obvious over *Ajayan*, likewise, dependent Claims 137 and 197-198 are also not *prima facie* obvious over *Ajayan* for the same reasons.

Regarding Claims 163, 164, 168 and 169, Claims 163 and 164 are dependent on Claims 127 and 128, respectively, and are further dependent on Claim 117. As stated above, Claim 117 has been amended to require single-wall carbon nanotube material. Claims 168 and 169 are dependent on Claim 136, which also requires an assembly of a fibrous material. Claims 127 and 168 further require that the carbon material comprise ropes of up to about 10^3 single-wall carbon nanotubes. Claims 128 and 169 further require that the carbon nanotube material comprise fibers of greater than 10^6 single-wall carbon nanotubes. As stated above, *Ajayan* does not teach or suggest ropes or fibers of single-wall carbon nanotubes, and the disclosures of *Ajayan* appear to teach away from the alignment of thicker nanotubes. Thus, as ropes and fibers are much thicker than the individual single-wall carbon nanotubes, the disclosures of *Ajayan* teach away from ropes and fibers of single-wall carbon nanotubes. Furthermore, independent Claim 136, and Claims 163 and 164, which are indirectly dependent on Claim 117, require the element of a fibrous material in addition to the carbon nanotubes. *Ajayan* does not teach or suggest an additional fibrous structural constituent and, thus, not only does *Ajayan* fail to teach or suggest all the elements of the claims, *Ajayan* also teaches away from the claims of the present invention. As there is no suggestion or motivation in the references to make the claimed combination, taken without the benefit of hindsight reasoning, a *prima facie* case of obviousness has not been established. Thus, Claims 163, 164, 168 and 169 are not *prima facie* obvious over *Ajayan*, and further in view of Applicant's admissions as to the scope and content of the prior art.

Regarding Claims 205-207 and 209-212, these claims depend directly or indirectly on Claims 203 or 204, each of which has been amended to require that a "plurality of single-wall carbon nanotubes are derivatized to facilitate bonding to other single-wall carbon nanotubes, the matrix material precursor or both," a feature not taught or suggested by *Ajayan*. As stated above, the teachings of *Ajayan* teach away from derivatizing nanotubes so that they chemically react with each other, a matrix material or a matrix material precursor, because reactions between the

nanotubes and/or a matrix material or a matrix material precursor would cause crosslinks that would deter or inhibit the alignment of the nanotubes that *Ajayan* seeks. Dependent Claims 205-207 and 209-212 also require additional elements not taught or suggested by *Ajayan*. For example, Claim 209, dependent on Claim 204, amended to require derivatized single-wall carbon nanotubes, includes the additional element of alignment of the single-wall carbon nanotubes by an electric field before forming the composite. As there is no suggestion or motivation in the reference to make the claimed methods, taken without the benefit of hindsight reasoning, a *prima facie* case of obviousness has not been established. Therefore, Claims 205-207 and 209-212, as amended, are not *prima facie* obvious over *Ajayan*, and further in view of Applicant's admissions as to the scope and content of the prior art. Thus, as *Ajayan* does not teach or suggest all the elements of these claims, and, also teaches away from the claims of the instant invention, Claims 205-207 and 209-212, as amended, are not *prima facie* obvious over *Ajayan*.

Regarding Claim 213, this claim to a method of producing a composite material has been amended to require, in addition to a fiber material, the elements of carbon nanotubes, a matrix material precursor, and a dispersion of the carbon nanotubes and the matrix material precursor. No new matter is added by way of amendment. All the limitations of this claim, as hereby amended are not taught nor suggested by *Ajayan*. As there is no suggestion or motivation in the reference to perform the claimed method, taken without the benefit of hindsight reasoning, a *prima facie* case of obviousness has not been established. Therefore, Claim 213 as amended, is not *prima facie* obvious over *Ajayan*, and further in view of Applicant's admissions as to the scope and content of the prior art.

Therefore, as a result of the foregoing, Applicant respectfully requests that the Examiner withdraw his rejection of Claims 121, 122, 129, 136, 137, 163, 164, 168-169, 175-177, 196-199, 205-207 and 209-213 as being unpatentable under 35 U.S.C. § 103(a) as obvious over *Ajayan*, as applied to claims 117-120, 126-128, 130-135, 138-140, 165, 166, 170-174, 184-189 and 200-204 above, and further in view of Applicant's admissions as to the scope and content of the prior art.

V. REJECTIONS UNDER 35 U.S.C. § 103(a) OVER AJAYAN AND FURTHER IN VIEW OF STEPHAN

Examiner has rejected Claims 190-195 under 35 U.S.C. § 103(a) as being unpatentable over *Ajayan* as applied to Claims 117-120, 126-128, 130-135, 138-140, 165, 166, 170-174, 184-189 and 200-204 above, and further in view of Stephan et al., "Doping Graphitic and Carbon Nanotube Structures with Boron and Nitrogen," *Science*, Vol. 266, Dec. 9, 1994, pp. 1683-1685 ("*Stephan*"). Office Action, at 4.

Examiner contends that "*Ajayan* does not teach doped nanotubes, however *Stephan* page. 1684 does as conductive materials. Using them in the polymer of *Ajayan* is an obvious expedient to make a conductive composite." Office Action, at 4.

Regarding Claim 190, this claim has been amended to depend from Claim 171, as originally intended. Claim 171, from which Claim 190 depends, requires carbon nanotubes and a matrix material, as well as the element of a fibrous structural constituent. Claim 190 requires the carbon nanotubes to comprise chemically-derivatized single-wall carbon nanotubes, chemically-derivatized single-wall carbon nanotube ropes, chemically-derivatized single-wall carbon nanotube fibers, or combinations thereof. There is no suggestion or motivation in *Ajayan* or *Stephan* or in the knowledge generally available to one of ordinary skill in the art to modify the reference. Also, *Ajayan* and *Stephan* do not teach or suggest, alone or in combination, all of these claim limitations of Claim 190. Therefore, Claim 190, as amended, is not *prima facie* obvious over *Ajayan*, and further in view of *Stephan*.

Regarding Claims 191-192 and 194-195, these claims depend directly or indirectly on Claim 190, as amended, and are not *prima facie* obvious over *Ajayan*, and further in view of *Stephan*, for the same reasons that Claim 190 is not *prima facie* obvious. Neither *Ajayan* nor *Stephan* provide any motivation to one of ordinary skill in the art to modify the teachings of *Ajayan* to produce the claims of the instant invention. Further regarding Claims 194 and 195, the references do not provide any motivation for the replacement of carbon atoms in the carbon nanotubes. Such a replacement with boron, nitrogen and combinations thereof, such as

hexagonal boron nitride, would negatively affect conductivity because hexagonal boron nitride is an electrical insulator. Therefore, a lack of motivation causes the establishment of *prima facie* case of obviousness to fail for Claims 191-192 and 194-195.

Regarding Claim 193, this claim has also been amended to depend from Claim 171, as originally intended. As stated above, Claim 171, from which Claim 193 depends, requires carbon nanotubes and a matrix material, as well as the element of a fibrous structural constituent. Claim 193 further requires single-wall carbon nanotubes having side-wall modifications capable of an interaction with the matrix material, wherein the interaction is physical, chemical or a combination thereof. There is no suggestion or motivation in *Ajayan* or *Stephan* or in the knowledge generally available to one of ordinary skill in the art to modify either of the references to produce the claimed combination. Also, the disclosures of *Ajayan* and *Stephan* do not teach or suggest, alone or in combination, all of these claim limitations of Claim 193. Therefore, Claim 193, as amended, is not *prima facie* obvious over *Ajayan*, and further in view of *Stephan*.

Therefore, as a result of the foregoing, Applicant respectfully submits that a *prima facie* case of obviousness has not been established for Claims 190-195, and respectfully requests that the Examiner withdraw his rejection of Claims 190-195 under U.S.C. § 103(a) as being obvious over *Ajayan* as applied to claims 117-120, 126-128, 130-135, 138-140, 165, 166, 170-174, 184-189 and 200-204 above, and further in view of *Stephan*.

VI. CONCLUSION

As a result of the foregoing, it is asserted by Applicant that the Claims in the Application are now in a condition for allowance, and respectfully request allowance of such Claims.

Applicant respectfully requests that the Examiner call Applicant's attorney at the below listed number if the Examiner believes that such a discussion would be helpful in resolving any remaining problems.

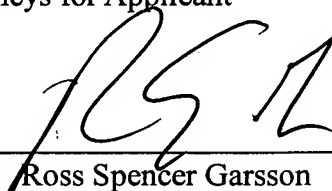
11321-P012USD9

PATENT

Respectfully submitted,

WINSTEAD SECHREST & MINICK P.C.
Attorneys for Applicant

By: _____


Ross Spencer Garsson
Reg. No. 38,150

P.O. Box 50784
Dallas, Texas 75201
Tel.: (512) 370-2870
Fax: (214) 745-5390

Austin_1 271178v.1

BEST AVAILABLE COPY

THE
NEW LEXICON
WEBSTER'S
DICTIONARY
OF THE ENGLISH LANGUAGE

◆ ◆ ◆

1988 EDITION

LEXICON PUBLICATIONS, INC.
NEW YORK



Webster's Online Dictionary
The Rosetta Edition™

[Home](#) [Browse](#) [Credits](#) [About Us](#)

☒ English
 ☐ Non-English

Copyright © 2005 Philip M. Parker, INSEAD. [Terms of Use](#).

Tip: Use your mouse to highlight any word on this page, and press **D** (as in define) on the keyboard to get the **definition**. Use it on non-English words to get the English **translation**.

NEW! Add this trick to your own web pages. Click [here](#) to find out how.

Precursor

Definition: Precursor

Precursor

Noun

1. A person who goes before or announces the coming of another.
2. An indication of the approach of something or someone.

Source: [WordNet 1.7.1](#) Copyright © 2001 by Princeton University. All rights reserved.

Date "precursor" was first used: sometime around 1425. ([references](#))

Etymology: Precursor \Pre*cur"sor\, noun. [Latin expression praecursor, from praecurrere to run before; prae before currere to run. See Course.]. ([Websters 1913](#))

Specialty Definition: Precursor

Domain

Definition

Chemistry

A substance from which another substance is formed esp. by natural processes (ethyl alcohol is the -- of acetic acid in the formation of vinegar). Source: European Union. ([references](#))

Chemical compound which forms a first stage of chemical process and serving as substrate in its further stages. Source: European Union. ([references](#))

Electrical Engineering

Any part, or all, of the starting material from which a single crystal is grown. This may be material which undergoes one or more chemical reactions prior to the actual crystal growth step. Source: European Union. ([references](#))

Environment In photochemistry, a compound antecedent to a pollutant. For